DOCUMENT RESUME

ED 048 703 EC 031 979

AUTHOR	Budoff, Milton
TITLE	Learning Potential: A Supplementary Procedure for Assessing the Ability to Reason in the Educable Mentally Retarded. Volume 1, Number 1.
INSTITUTION	Research Inst. for Educational Problems, Cambridge, Mass.
PUB DATE	70
NOTE	20p.
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	Ability Identification, *Academic Ability, *Educable Mentally Handicapped, *Exceptional Child Research, *Learning Characteristics, Nonverbal Learning

ABSTRACT

A discussion of learning potential among educable retardates reflects the author's findings that some solved difficult problems on the Kohs block designs, some did not do well at first but improved after coaching, and some did not do well before or after coaching. Additional studies of these highscorers, gainers, and nongainers are cited which explored performances on other kinds of tasks. The argument is presented that the high scorer and probably the gainer are more clearly educationally retarded and suffer in the usual special classes where their weaknesses in language arts and reading are continually exposed. It is suggested that increased attention be given to non-language abilities through nonverbal presentations and methods. (RJ)

EC031979

EDO 48703

STUDIES IN LEARNING POTENTIAL

LEARNING POTENTIAL: A SUPPLEMENTARY PROCEDURE FOR ASSESSING THE ABILITY TO REASON IN THE EDUCABLE MENTALLY RETARDED

By

Milton Budoff

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

EC 031 979E

Volume 1, Number 1

1970

Research Institute For Educational Problems
12 Maple Avenue Cambridge, Massachusetts

1

EC031979

ED048703

LEARNING POTENTIAL: A SUPPLEMENTARY PROCEDURE FOR ASSESSING THE ABILITY TO REASON IN THE EDUCABLE MENTALLY RETARDED[1]

Milton Budoff[2]

Cambridge Mental Health Center
Harvard Medical School

The Heber (1961) manual distinguishes measured intelligence and adaptive behavior as two major dimensions by which mental retardation is defined. However, adaptive behavior for the mild and moderately retarded school age child is defined by adequacy of school performance (p. 63). Clearly, school performance and Binet IQ are very closely associated, especially by the close of the primary grades when both the school and the Binet become increasingly verbal-conceptual in their demands. A major difficulty with the classification manual then, is that the search for two relatively independent criteria was not successful with the higher ability educable retardate because the two criteria are not independent. Adaptive behavior, as defined, covers a very narrow range of behaviors, and refers mainly to the normative course that most children take in focussing on school adequacy. It fails to credit competencies in the areas of social and practical behaviors, which tend to be more highly developed among the poor families from which educable mentally retarded (EMR) children come, and which tend to tap domains of abilities which are probably somewhat independent of those related to school competence.

The definition of adaptive behavior for the post-school age group takes account of non-school related achievements by using the degree of social and vocational adequacy as the yardstick. The evidence from follow-up studies of the school age diagnosed EMR certainly supports the expectation that the large mass disappear as social problems and adjust in society as satisfactorily as non-EMR agemates from the same lower socio-economic backgrounds. Kennedy's (1966) follow-up study of a sample of school-age-diagnosed EMRs twelve years after a first post-school study showed that there was continuing occupational advancement for the former EMRs in the blue collar occupations, and that a small percentage (8%) even functioned adequately in semi-professional, managerial, or proprietary work.

---

1 An abbreviated version of this paper was presented at the American Association on Mental Deficiency, Boston, Massachusetts, 1968. The research program described was made possible by support of grant 10588 from the National Institute of Mental Health, and 32-31-0000-6019 from the Division of Handicapped Children and Youth, Office of Education, U. S. Department of Health, Education and Welfare.

2 20 Sacramento Street, Cambridge, Massachusetts 02138

The definition of adaptive behavior for the post school period is sensible because it recognizes that some severe school failures may have abilities and strengths that are independent of the child's earlier school failure and low Binet IQ score. But using school adequacy as the criterion of adaptive behavior for severely school failing children is patent nonsense since the failure was the reason for singling them out originally for an intelligence test and possible special placement. Worse for the child, it leaves measured intelligence as the only criterion by which to formally designate a child as an EMR.

What is required are additional measures that will credit the competencies displayed by school diagnosed EMRs in non-school related areas. The manual on classification fails to accomplish this by focussing its definition of adaptive behavior on the child's school failure.

Rather, it should seek ways of assessing skills and competencies that are more oriented toward interpersonal and practical competencies. An alternate strategy we have adopted in our research is to seek a means by which to assess ability to reason that is somewhat independent of the Binet type of measure.

Arguing from an essentially similar position to Jastak (1949), the author and his collaborators have been studying a learning potential assessment strategy as a means of obtaining an estimate of general ability in a context that minimizes the possibly adverse effects of the child's prior home and school experiences. The rationale of the procedure is to directly question the implicit assumption that low Binet IQ children are markedly handicapped in profitting from a learning experience by making a direct test of this assumption. The essence of this assessment strategy is to impose some control on the potentially negative effects on his school performance of the life experiences of a child from a non-middle class social background. With children who are not motivated to perform at their best, the learning potential assessment strategy seeks to minimize the artificiality of the test situation, the negative affect associated with school learning materials, and the possibly unfamiliar content of the usual tests. It involves the child in repeated contact with the problem materials presented on the test in an evaluation situation that strives to have the school problem learner maximize his probability of success. A repeated exposure reduces the strangeness of the test materials presented, and provides the child with opportunities to develop and demonstrate his competence over successive trials. As will be indicated below, the increased competence demonstrated does not appear to be specific to the particular learning potential task used. The intent of this assessment strategy is to obtain an estimate

of general ability derived from reasoning problems of suitable difficulty which might permit a comparison with the verbal-conceptual deficit implied in the low scholastic aptitude score (e. g. the Binet IQ). If the child does show a marked discrepancy in score, the assumption of low general ability provided by the low Binet IQ can be questioned. In short, what we are seeking is an alternate or supplementary procedure which can tap a "g" type of ability on a game-like task that can not be related to school activities. This procedure does not directly tap the competencies that might be subsumed under "adaptive behavior". But the use of non-verbally dependent measures in a novel assessment strategy does permit us to make an estimate of ability that has some degree of independence of the usual Binet type of score, and hence serves to clarify the measured intelligence criterion.

The proposal to define intelligence by the demonstrated capacity to benefit from experience must however be qualified, since the improvement must be related to predictive criteria. Thus, while Jastak's argument (1949) for the use of a broad range of tests in diagnosing the retardate is generally acceptable, his commitment to discard a diagnosis of retardation if the "S scores above the third percentile on any task" may be too lenient. There are many tasks which are not predictive of a suitable adult vocational or academic performance, given optimal training, because they attain an asymptote too early in life. This is one major criticism of most laboratory learning tasks that have been used, unless their difficulty level is manipulated artifically through the use of measningless nonsense materials and arbitrary solutions set by the experimenter. If the argument that the child who demonstrates ability on the learning potential task is capable of performing beyond the retarded level is to be empirically and behaviorably meaningful, then the tasks chosen must be sufficiently difficult to predict higher level performances in areas not specific to the particular learning potential task(s). That is, if the child can demonstrate marked improvement on a learning potential assessment, then, the improvement must be shown to be a manifestation of general ability to reason that will be displayed in other situations when the factors which penalize his performance are controlled. I wish to emphasize that a learning potential assessment procedure must be shown to be empirically valid, i. e., if must be shown to predict performances consonant with the claims made for the heightened ability demonstrated, in contrast with the low Binet score.

For the remainder of this paper, I shall present some data relating to a learning potential procedure which has been used in studies with educable mentally retarded (EMR) persons.

Jensen (1964) reviewed the literature in the areas of early experience, perceptual development and environmental deprivation and sought to

show that it is the verbal deficit to which much of the lower class disadvantage can be attributed. But tasks that involve a verbal and/or problem solving process were hypothesized to be a poor choice as a learning potential measure of general ability with severe school learning problem children since these tasks are too similar to those on which the child has failed in school. Miller and Griffiths (1961) present evidence in support of this hypothesis. They sought to train institutionalized educable mentally retardates on a similarities type of task such as is found on the Wechsler tests. They reported no transfer to non-coached items following coaching, though the subjects did tend to respond correctly to coached items.

In our studies it was hypothesized that learning potential ability may be most evident when the tasks do not involve verbal concepts in which the child has endured repeated failures. The hypothesis of these studies was that given the opportunity to learn how to solve a non-verbal reasoning task through the medium of a systematic learning experience, some educable retardates would markedly improve their performance beyond the expectations based on their Binet IQ ratings. A task was chosen which was not related to school work, yet required a large component of reasoning for its successful solution. To counteract the history of repeated failure in learning, a procedure was designed in which the retardate had the opportunity to learn how to solve a problem which assumed little previous knowledge, and during which he could enjoy maximal success.

The Kohs Block Design Test was the reasoning task utilized. Training was directed toward teaching the principles involved in the construction of the block designs. The materials consisted of a test series of sixteen of the original Kohs Block Designs (Kohs, 1923), including five designs with sixteen blocks. The designs were arranged in order of increasing difficulty. Design 7 from the Wechsler Adult Intelligence Scale was added. The designs were printed on 5" x 6" white cards to double the scale of the original Kohs designs so that the stimulus designs and the block constructions were equivalent in size. A design of four blocks was drawn as a two-inch square; one of nine blocks as a three-inch square; one of the sixteen blocks as a four-inch square. This modification was suggested by Goldstein and Sheerer's adaptation (1941) as a means of simplifying the task for the S. The four colors, i.e., red, white, blue and yellow, were retained. The usual one-inch cubes were used as the blocks. The five coaching designs consisted of three four-block designs (C from WISC; 3 and 7 from the Kohs series) and two nine-block designs (5 from the WISC and 8 from thw WAIS). The coaching designs were printed in the same format and dimensions as the test designs.

The sixteen test designs were administered individually three times: prior to coaching, and then one day and again one month following coaching. Kohs' instructions for administering the block design test were used at each test session (Kohs, 1923). A sample problem was demonstrated by the examiner. The child had to construct it correctly before the remainder of items were presented. Testing was discontinued after three successive failures.

The coaching procedure emphasized the following principles:

1. The subject's probability of success on a coaching item was maximized by the possibility of working down to the simplest elements in the design. Praise and encouragement were freely given.

2. The principle of motorically checking his construction, block by block, against the design card was built into the coaching procedure. It was assumed that the retardate is distractable and displays poor work habits. He was required, therefore, to actively point, block by block, to his constructed design and the corresponding blocks on the design cards. This was done on all the stimulus cards in which all the blocks on a stimulus card were delineated. It was hoped thereby to encourage a more planned and systematic work approach and to allow the subject to see concretely the success he was achieving.

3. The concept of two-color blocks was emphasized repeatedly as the elements composing the design, e.g., the process of building a stripe was demonstrated.

INSERT FIGURE 1 ABOUT HERE

The coaching sequence for an item was so designed that the subject had to solve the problem initially from a stimulus card in which the blocks were undifferentiated. If he failed to solve the problem, he was presented one row of the design at a time. Initially the blocks composing the row were not outlined. On succeeding presentations, if the subject failed to align the blocks correctly, the design was progressively outlined, e.g., see progression of Figure 1B. On the stimulus cards in which all the blocks were completely outlined (on Figure 1, B3, C2, E3), and one the final card (B2), the subject was required to check whether each block in his design corresponded exactly with the comparable block on the stimulus card. When two rows of the design were completed, the

experimenter demonstrated how they fitted together to form the corresponding portion of the pictured design (Figure 1, D and F). After the entire design was learned in this piecemeal fashion, the subject was asked to reconstruct the pattern from the final stimulus card in the coaching series in which all the blocks were outlined (Figure 1G). The coaching series for the four-block items was simpler, though based on the same principles.

In the first study utilizing this approach (Budoff and Friedman, 1964), the subjects consisted of thirty-two institutionalized EMRs between 16.5 and 19 years of age. No known organically impaired subjects were used. Pairs of subjects were matched for chronological age and Stanford Binet IQ. One member of each pair was randomly assigned to the experimental condition of coaching. The second subject was assigned to a control group which was not coached but went through all three trials on the dependent variable in the same manner as the coached S.

INSERT FIGURE 2 ABOUT HERE

As one might expect, the coached group demonstrated higher scores at both higher (63-78 IQ) and lower (42-57 IQ) levels, as is indicated in Figure 2. This result with institutionalized late adolescent educable retardates was replicated successfully with a different sample and examiner in the same institution. Contrary to our expectations, the expected increase on the retest one day following coaching did not decrease by the time of the retest one month later. Rather, as the line of the figure suggests, there was a small, non-significant mean gain instead.

Even more interesting was the observation that coaching did not uniformly raise the scores of all Ss markedly. Some EMRs demonstrated little or no gain (we refer to them as nongainers) while others demonstrated quite marked gain (gainers). These latter individuals solved four or more designs on the post test than on the pretest - an increase in score equal to three times the mean increase in score of the non-coached control group (1.2 designs).

A third pattern of response became evident. Some EMRs solved difficult nine and sixteen block designs on the pretest, prior to coaching (high scorers). Thus, the three patterns which can be described were those of learners and nonlearners following tuition and those who learned without requiring tuition, much as the higher IQ child becomes more proficient as he progresses through the task.

The next problem was whether these different patterns of response to the block designs indicated ability specific to the particular task,

or, as the foregoing argument suggests, more generally available ability to reason which was made evident by the learning potential (LP) procedure. The research program since these first studies has focussed on seeking correlates of these different LP statuses (high scorers, gainers and nongainers).

No differences were apparent between the learning potential groups when the CA, Binet IQ and Wechsler Verbal Scale IQ (VIQ) on the coached Ss in these first studies were compared. Marked differences in mean score were apparent in Wechsler Performance Scale IQ (PIQ), when these were calculated omitting the block design score, and the scores for the four remaining tests were prorated ($t = 3.48$; $p < .01$). Further analysis indicated that gainers tend to have markedly higher PIQs than VIQs, the PIQs often falling in the dull and average ranges.

Gainers and nongainers also differed significantly in mean scores on Raven's Progressive Matrices (Series ABCDE). The gainers scored markedly higher than the nongainers ($t = 3.39$, $p < .01$), a finding consistent with the differences in Wechsler PIQs. When the sample was dichotomized at the fifth percentile, the lowest percentile value given in the Raven's manual, the gainers grouped above the fifth percentile; the nongainers below it ($X^2_{1df} = 6.86$, $p < .01$). Simple learning tasks were administered - a double alternation and a paired associate problem and on both tasks, the gainers demonstrated superior speed and efficiency in learning (see Budoff, 1967, for a detailed presentation of these findings).

Two other studies helped define further the meaning of the three learning potential response patterns. Both studies were concerned with exploring the implications of the thesis that high learning potential status denotes academic failure but not an intrinsic mentalretardation.

In the first study Kounin's (1941) studies of rigidity was repeated substituting Zigler's marble sorting satiation task, and extending the concept shift task to a three rather than a two concept task. Samples of special class gainers and nongainers between the ages of 12 to 16 years, with a mean CA of 14 years, and Binet IQ of 72.8, hence an MA of 10 years, were selected. There were two control groups, a sample of fourth graders of average IQ who served as MA controls, and ninth graders who served as CA controls. All the Ss were from working class backgrounds. The groups contained equal numbers of boys and girls. Zigler (1961) has argued that social deprivation in the life history of children, whether retarded or not, results in increased rigidity of behavior. The four groups, then, were also divided equally into deprived and nondeprived subgroups on the basis of social history records available in the schools

and from consultation with the child's teacher.

Two sessions were held with each child, a warm-up session to reduce anxiety, and the experimental session. On the concept shift task, the child was promised a candy bar if he could sort for each concept successfully.

The analyses supported the hypothesis that the performance of the gainer would parallel that of the CA control, while that of the nongainer would parallel that of the MA control. Thus, on the simple satiation task, the CA normals spent less time than the other groups, the gainers spent less time than the nongainers and MA controls, and there was no difference in mean time spent between the nongainer and MA controls.

The CA normals also required fewest trials to switch concepts. The gainers required fewer trials than the nongainers ($p < .05$), but the MA normals did not differ from either the gainers or nongainers, their mean score falling between these two groups (see Figure 3). Ranking the means, the CA normals grouped for the three concepts most rapidly (M = 1.05 trials per concept), followed by the gainers (1.90), MA normals (2.47) and nongainers (3.30). All three groups required significantly more trials to switch concepts than did the CA normals. CA controls, gainers, MA controls and nongainers, in that order, required

INSERT FIGURE 3 ABOUT HERE

a greater mean number of trials to sort for successive principles. The greatest discrepancy in performance between gainers and MA controls occurred in sorting for the third concept, the latter group required more trials.

When the number of children in each group who attained each concept was tabled, fewer nongainers sorted for the more difficult concepts (shape and number) than members of the three other groups (for shape: $X^2_{3df} = 9.430$, $p < .05$; for number: $X^2_{3df} = 12.180$, $p < .01$; for color: $X^2_{3df} = 6.0$, nonsignificant). The MA normals also performed relatively poorly in sorting for the most difficult (number) concept ($X^2_{3df} = 12.180$; $p < .01$).

It was predicted that socially deprived Ss would demonstrate greater rigidity than non-deprived subjects. For the simple marble task, non-deprived children tended to satiate more frequently than deprived children ($X^2_{1df} = 10.4$; $p < .01$). But, contrary to the expectation drawn from Zigler's work, there were no differences in performance on the concept switching task which could be ascribed to level of social deprivation.

The differential response of gainers and nongainers to the rigidity task lends further support to the validity of a learning potential approach to the diagnosis of adolescents whose verbally based IQs cause them to be labelled as educable mentally retarded. The flexibility displayed by the gainer EMRs tended to parallel the performance of the CA controls when the Ss were presented with a maximally motivating situation, i.e., a supportive, non-threatening work context, problems that did not depend on a verbal input or response, and a tangible reward for achieving a clearly defined goal. The congruence of performance patterns of nongainers and MA controls on the rigidity tasks, and on other psychometric and learning tasks suggest that the nongainer may be more truly or intrinsically mentally retarded, though this is a conclusion requiring further study (see Budoff and Pagell, 1968, for a complete presentation of this study).

The educational significance of the learning potential argument was also studied. If, as we argue, the high learning potential child is educationally retarded, then their performance on a properly designed educational curriculum should indicate ability to learn from a suitably designed curriculum unit that would be similar to that shown by CA controls, and most particularly, to low achieving CA controls, who are also educationally retarded.

An educational unit that taught simple electrical concepts by allowing the student to manipulate flashlight batteries, bulbs and copper wires was adapted from a unit produced by Educational Development Center (1966). We formulated a special test by which to evaluate how much they knew about electrical circuits prior to the course, and then re-tested them following the close of the unit. This test was nonverbal in the sense that the students could demonstrate their understanding by pointing to electrical circuits mounted on pegboards to indicate which bulb would light in one section. Or, in the second part, when they were given their own simple circuit including a lighted bulb and one battery, they merely had to indicate whether the bulb specified in the circuit on the pegboard would light or not, and if so, whether it would be brighter, dimmer or of the same brilliance as the standard bulb which they held lit in their own hands. This format was also repeated in a written version where they answered simple questions on printed diagrams that closely resembled what actual circuits looked like, and, in a second section, from schematic or symbolic representations of these circuits as they might appear in a physics text. Responding to the test required no verbalization, although at specified times we did ask the S why they had given the particular answer.

The results of the evaluation of the laboratory science classes that were conducted with both groups again supported the argument that high learning potential status students are educationally rather than mentally retarded.

That is, the level of scores on the evaluation instrument did not differentiate between the EMR or non EMR CA control groups, but tended, by and large, to differentiate the total sample, regardless of school placement, on the basis of their learning potential status.

This was even more clearly evident when the performance of the low achieving CA controls was compared with the EMR samples. The low achieving controls were defined as those students whose mean grade point average for the major subjects for four of the five marking periods fell below a 2.0 or a C average. What was interesting in these comparisons was that the superior level of performance on the pretest of the low achieving CA controls was no longer evident on the posttest. There were no differences between the two groups when posttest or improvement scores were compared, but almost all the significant F-ratios are lodged in the main effect for learning potential. Thus, even more consistently than with the larger sample of CA controls which included some high and average achieving students, the low achieving students' level of knowledge on the electricity test is indistinguishable from that of the special class students taken as a group, following exposure to a suitably designed curriculum unit. High scorers, gainers, and nongainers in that order, tended to display knowledge of electricity in accordance with their learning potential status. Further, when subjected to a sign test, the mean gain scores for the special class high scorers and gainers were slightly higher on each section of the electricity posttest when compared with gainers and high scorers in the regular classes ($< .01$).

The implication for our argument is that the high scorer, especially, and the gainer probably, are more clearly educationally retarded and that they suffer ignominiously in the usual special classes because they are compelled to work with materials that continue to expose their weaknesses in language arts and reading. They do not have the opportunities to learn in situations in which expression of their ability may become evident, that is, when learning in school does not depend on the proficiencies that they lack.

We have motivational and social competence data drawn from interviews with matched special and regular class adolescents that also supports our thesis that high scorers and gainers are deficient in their handling of language arts and verbal conceptual materials, but do have competencies outside these areas that are similar. Some social history and test correlates of learning potential status based on a community EMR sample of 383 subjects drawn from a variety of communities in Massachusetts, indicates some of the characteristics of the three learning potential groups.

Of the total sample, 60% of the special class children born in the northeastern part of the United States attained gainer or high scorer status; 40% were nongainers. One has a maximal probability of attaining gainer and high scorer status if one is white, over 15 years, male, from the lower socio-economic groups and living in situations that have been classically associated with poor school performance, e. g., if one is a member of a family of recent immigrants, or one's parents do not speak English, or one's family is large. The suggestion is that when the child is not from the middle class, but his family is at least benign emotionally, the child will tend to demonstrate ability on the nonverbal learning potential task. When there are instances of family instability, e. g., divorces, separation, desertions, the child has a higher probability of being a nongainer, although as he grows older, he may develop sufficient ego to function more adequately on the particular learning potential task used.

The middle class child, by contrast, tends to be a nongainer. In this case, where there is no cultural disadvantage by which to explain the lack of school success, this inability may be due to the effects of very strong negative emotional pressures because of the parental expectations for satisfactory achievement, a "true" retardation, of an interplay of the two sets of factors.

Girls tend to be over represented as nongainers, possibly because the girls' later placement in special classes results in more experiences in failure, prior to this placement, and/or because they may respond less well to the type of problems presented in this particular learning potential assessment procedure.

Learning potential status, on this task, is correlated with CA. The incidence of nongainers from 12 years to the post school years (16-19 years) decreases from 60% to 33%. By contrast, about 1/3 of the samples at each age from 9-19 years are gainers. Because of the difficulty of the task, high scorers represent only 1/12 of their chronological group below 11 years, but about 1/3 of the post-15 year olds.

Independently of this data, there is also a suggestion that some children's competence in learning may change from the younger ages to the adolescent years. Learning potential status is uncorrelated with Binet IQ obtained during the early school years, but is increasingly correlated with more recent IQs. It may be that the population of severe learning problems are more homogeneous early in their school careers, but that the older special class child will be increasingly more heterogeneous in ability levels in nonverbal areas, though the range in verbal conceptual ability as represented by Binet IQ scores may re-

main quite narrow.

Finally, institutionalized as compared to community EMRs tend to fall into the nongainer group (53% versus 40%), as might be expected since these children come from much more unstable homes, and have lived in a more difficult and restrictive environment, at least in a state (Massachusetts) which has special classes available in most communities. Children with IQs in the border line and mildly retarded ranges tend to be institutionalized only when the family can not care for the child adequately.

Also, in cases with clear evidence of brain insult but not including those with a history of seizures, tend to be nongainers ($X^2_{3df} = 8.9$, $p < .03$), though other diseases - heart, tuberculosis, kidney, rhuematic fever, visual or hearing problems are not related to learning potential status.

DISCUSSION

We interpret these results as meaning that the largely academically oriented criterion for labeling a child retarded during the school years is much too restrictive and often becomes a self-fulfilling prophecy. The attempt in the learning potential assessment strategy is to plumb the limits of a child's ability to function more adequately with reasoning and learning types of problems when one substantially alters the conditions in which this learning takes place. Thus, the familiarity with the task materials, the stress on a relationship that will maximize success for the child and demonstrate to him that he can master the problem, pointing out the relevant dimensions required to solve the problem, providing relatively instant feed-back, and deemphasizing teaching to the areas of disability that the child has displayed in the verbal-academic subject matters which would tend to turn him off in a task, all operate to test whether the child can apply the relevant principles involved in solving particular problems to novel situations.

In plumbing the limits of what the child can do, one can determine whether there really is a persisting and generalized inability which might be one way in which a persisting or functional mental retardation might be defined behaviorally. But another precaution must be added and this is that the tasks selected must be of a reasonable difficulty level such that successful performance can have some normative relationship to what other children might be able to do. Now this is a matter of some great difficulty since altering the task conditions obviously alters the difficulty level of the task for normal children. The demonstration of equivalent learning ability as a function of learning potential status in the laboratory science unit on

electricity does however suggest that with special learning situations that deemphasize reading and verbal expression, one may expect quite different levels of competence displayed by children of differing learning potential status regardless of school placement, if they share a common educational retardation, e. g., when the comparison children are higher IQ children with quite poor reading levels.

Thus, two optimal strategies by which to evaluate the meaning of the ability to profit from the tutorial experience provided by the learning potential assessment strategy suggest themselves. The first requires a longitudinal investigation in which levels of occupational and social outcomes can be related to learning potential status. The more short range investigations would study response to specially designed curricula that would tap the high learning potential children's nonverbal reasoning skills in suitable educational contexts. If these higher level performances can be shown to be educationally meaningful, then the validity of the learning potential status would be demonstrated. What this does is to take the rationale underlying our work one step further. If this alternate criterion of ability which is less related to scholastic aptitude can be developed for younger children, can the educational retardation be prevented by early and successful interventions at the time the child begins to fail? Or, are a large proportion of these children somehow deficient in their ability to handle verbal conceptual materials, such that though they are able children, they require very different educational goals, namely markedly less emphasis on language arts, and attempts to teach content areas such as mathematics, social studies, science, etc., in largely nonverbal presentations. Perhaps, as one insightful teacher has put it, "If this is their persisting difficulty, can't we let these children do their compositions for social studies with a videotape recorder, or a series of Polaroid pictures strung together by relatively uncomplicated verbalizations?"

The essence of our argument then, is that a large proportion of the so-called mentally retarded from low income backgrounds <u>are</u> academic risks in a traditional school setting. But this failure to learn via traditional methods can not simply be extrapolated to indicate a generalized inability in an adult life which permits these children to bypass their deficient literacy skills in the occupations they fill. Rather, when methods by which this seeming inability are developed that are uncontaminated by their already demonstrated deficits in reading, etc., and the failure set is overcome, many so-called educable retarded children are able to reason adequately. Our data demands that we address ourselves more directly to the abilities in the non-language, non-school related areas that large proportions of these so-called mentally retarded students display.

This work represents only a beginning. Presently we are investigating alternate measures of learning potential that may not have the biases evident for the Kohs Block Design task, and that also may be applicable at much younger ages (7-8 - 19 years). When motivational factors and measures of present learning competence are added to a battery of learning potential measures, it should be possible to ferret out ability to reason and learn which is not evident in the normal school setting.

BIBLIOGRAPHY

Budoff, M. and Friedman, M. LEARNING POTENTIAL AMONG INSTITUTIONALIZED YOUNG ADULT RETARDATES. American Journal of Mental Deficiency, 1967, 72, No. 3, 404-411.

Budoff, M. and Friedman, M. LEARNING POTENTIAL AS AN ASSESSMENT APPROACH TO THE ADOLESCENT MENTALLY RETARDED. Journal of Consulting Psychology, 1964, 28, 434-439.

Budoff, M. and Pagell, W. LEARNING POTENTIAL AND RIGIDITY IN THE ADOLESCENT MENTALLY RETARDED. Journal of Abnormal Psychology, 1961, 62, 413-421.

Goldstein, L. and Sheerer, M. ABSTRACT AND CONCRETE BEHAVIOR. Psychological Monographs: General and Applied, 1941, 53, No. 239.

Heber, R. A MANUAL ON TERMINOLOGY AND CLASSIFICATION IN MENTAL RETARDATION. American Journal of Mental Deficiency, 1961, (Monograph Supplement).

Jastak, J. A RIGOROUS CRITERION OF FEEBLEMINDEDNESS. Journal of Abnormal and Social Psychology, 1949, 44, 367-378.

Jensen, A. R. SOCIAL CLASS AND VERBAL LEARNING. Unpublished manuscript. Berkeley, University of California, 1964.

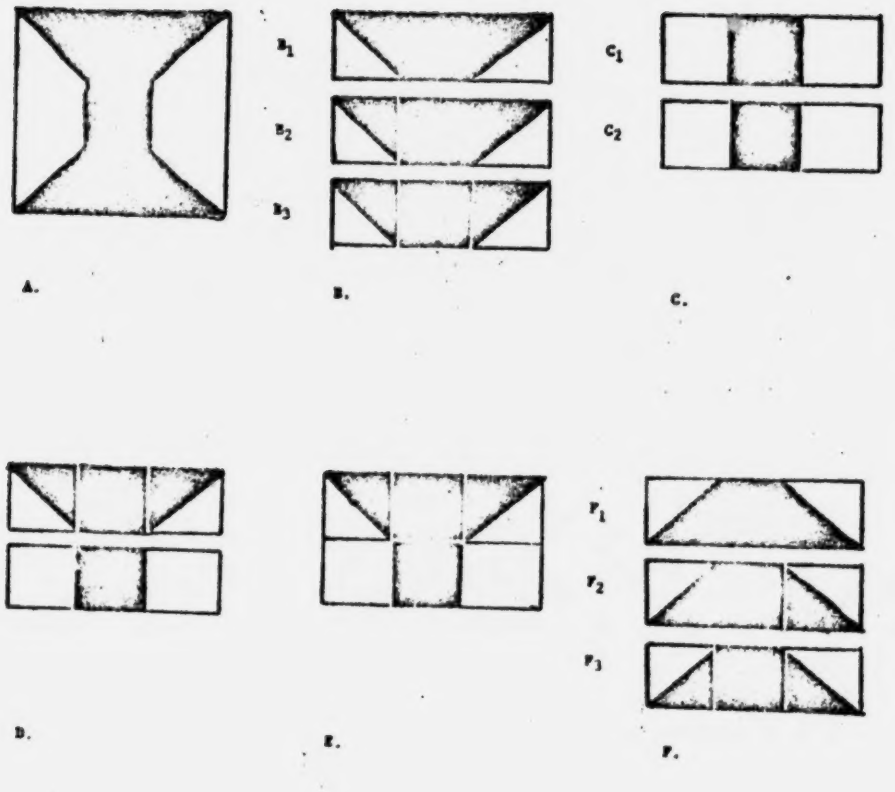
Kennedy, R. J. R. A CONNECTICUT COMMUNITY REVISITED: A STUDY OF THE SOCIAL ADJUSTMENT OF A GROUP OF MENTALLY DEFICIENT ADULTS IN 1948 AND 1960. Connecticut State Department of Health, Office of Mental Retardation, Hartford, 1966.

Kohs, S. C. INTELLIGENCE MEASUREMENT. New York: Macmillan, 1923.

Kounin, J. EXPERIMENTAL STUDIES OF RIGIDITY 1 THE MEASUREMENT OF RIGIDITY IN NORMAL AND FEEBLEMINDED PERSONS. Character and Personality, 1941, 9, 251-273.

Miller, M. and Griffith, B. C. THE EFFECTS OF TRAINING VERBAL ASSOCIATES ON THE PERFORMANCE OF A CONCEPTUAL TASK. American Journal of Mental Deficiency, 1961, 66, 270-275.

Zigler, E. SOCIAL DEPRIVATION AND RIGIDITY IN THE PERFORMANCE OF FEEBLEMINDED CHILDREN. Journal of Abnormal and Social Psychology, 1968, in press.



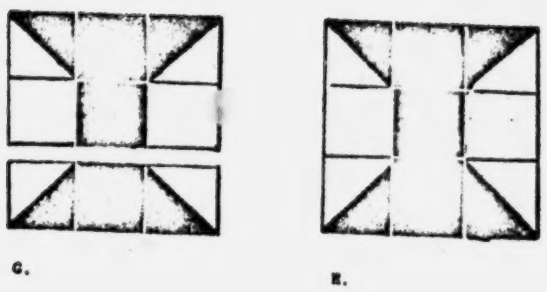


Figure 1. Coaching procedure illustrated for nine block design (#4)

1-A. Initial design card.
1-B. Stimulus cards for top row of the design.
1-C. Stimulus cards for middle row of the design.
1-D. Card showing relationship of upper two rows of the design.
1-E. Card showing the two rows placed together.
1-F. Stimulus cards for lowest row of the design.
1-G. Card showing the relationship of the upper two rows and the lowest row of the design.
1-H. Final card with all blocks outlined.

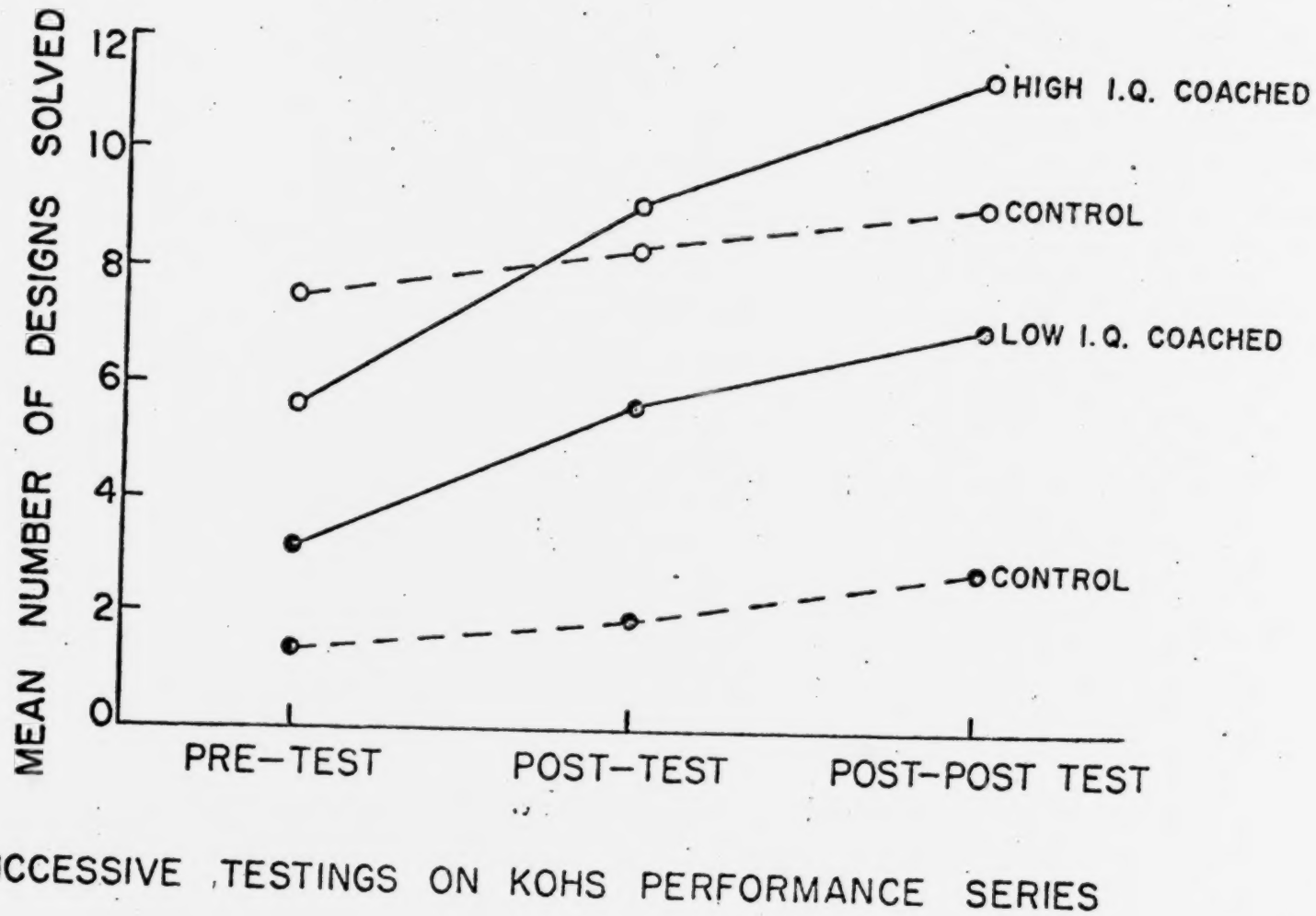


Figure 2. Change in performance as a function of IQ level and coaching.

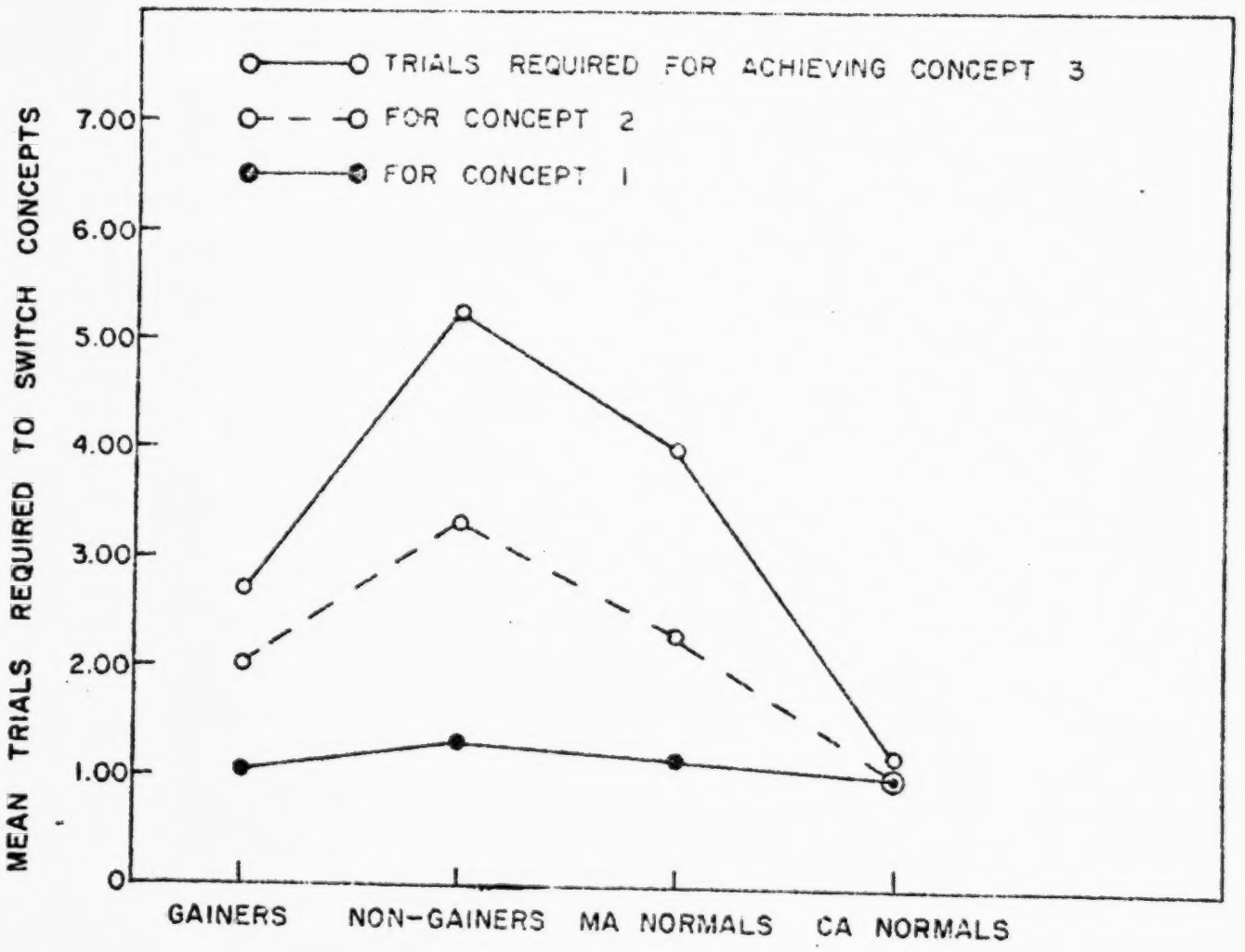


Figure 3. Groups by Concepts Interaction: Task II. Concept Switching.

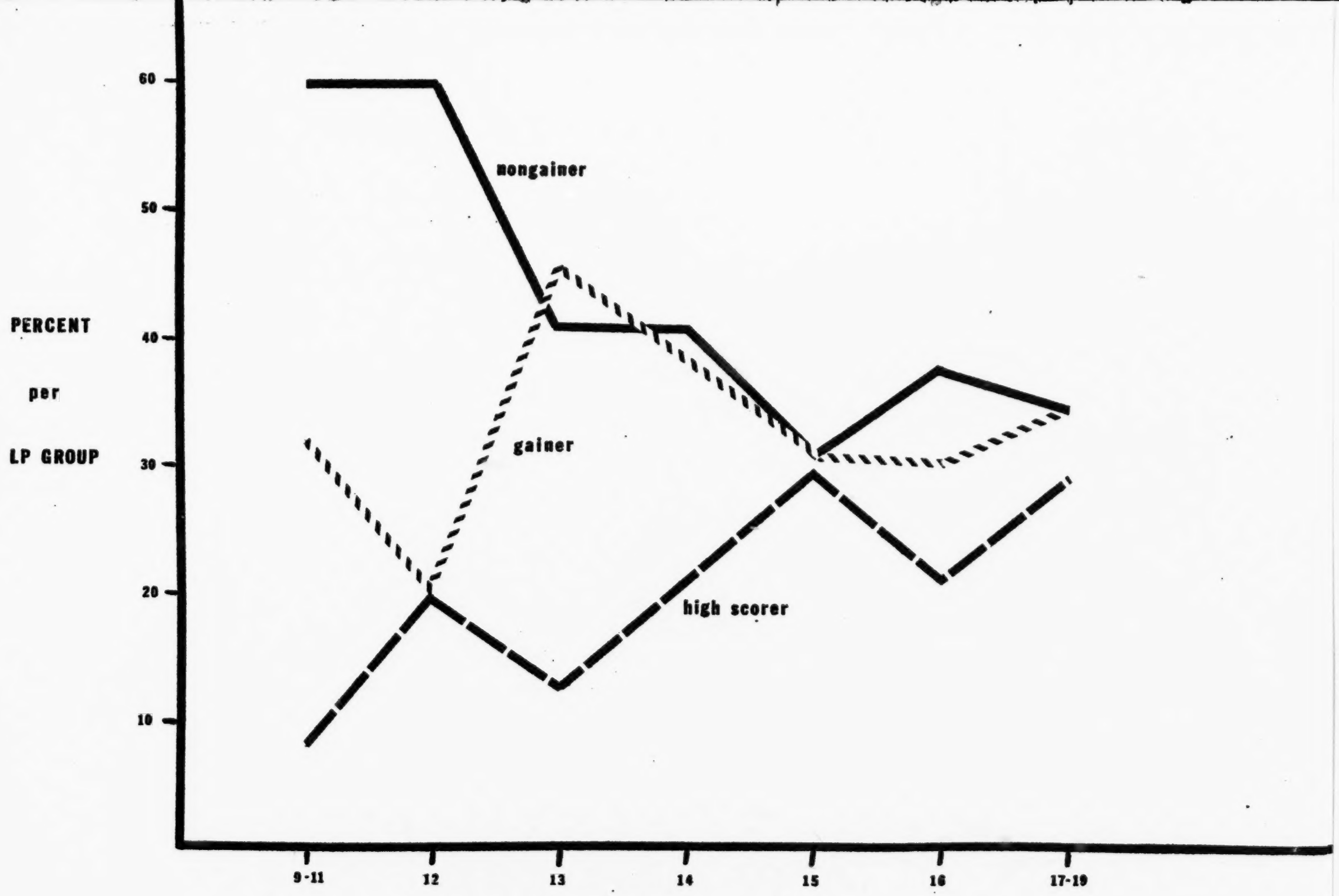

60
50
40
30
20
10
PERCENT
per
LP GROUP
nongainer
gainer
high scorer
9-11
12
13
14
15
16
17-19
CA at INITIAL KOHS

Figure 4